

Physical and Social Environmental Conditions Affected by Rob Flood on the Semarang Coast

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Abstract. Flood is an environmental problem that regularly occurs in communities around the coast. This condition causes changes in the physical and social environment of the community so that they can continue to live with the requirements of the tidal flood environment. Communities on the coast must adjust to the conditions in which they live in tidal flood areas. This study aims to find out how the physical and social environmental conditions of the community affected by the tidal flood on the coast of Semarang are and the factors that affect the physical and social needs of the community affected by the tidal flood on the coast of Semarang. This study uses a qualitative method. Data were collected by observing the field, conducting interviews with informants, and studying documents or literature. The location of this research is in Kaligawe and Tambak Lorok Villages, Semarang. The results of this study are that the Kaligawe and Tambak Lorok communities affected by tidal flooding on the coast of Semarang adapt to the physical environment, namely the conditions of their homes, places of worship, and public facilities. House building because the house building is lower than the village road. In the social environment of the community affected by tidal flooding both in Kaligawe and Tambak Lorok, there is a kind of bond that makes the community strong in facing tidal flooding for dozens or even decades. The internal factor is the feeling of sharing the same fate, making them strengthen each other outwardly and inwardly.

Key words: Physical Environment; Social Environment; Rob Flood

How to Cite: Setiawan, D., Setyowati, D.L., Atmaja, H.T. and Mustofa, M.S. (2022). Physical and Social Environmental Conditions Affected by Rob Flood on the Semarang Coast. *ISET: International Conference on Science, Education and Technology* (2022), 412-417.

INTRODUCTION

A good, healthy, clean living environment is also a need that cannot be ignored. The atmosphere is one of the essential roles and positively affects the realization of public health status. Human life is very dependent and influenced by the conditions and existence of the environment. Nowadays, the situation and environment of Indonesian society are still very concerning, and these events are still happening in today's community. Environmental problems in Indonesia occur in various sectors and their respective complexities, causes, and consequences. For example, issues regarding the provision of clean water facilities, environmental pollution problems, and waste problems arise. Human activities in coastal areas trigger coastal dynamics (Rijanta et al., 2014). These ecological problems have various negative impacts that cause natural disasters such as floods and sea level rise (rob). The climate change in Semarang impacts coastal abrasion and land subsidence on young land due to sedimentation. Coastal abrasion causes the coastline to shift inland by 2.6 km (Semarang City Government, 2016). One area vulnerable to this environmental problem is the Semarang coastal environment, especially in Kaligawe and Tambak Lorok. The sea level rise (rob) that occurs in the coastal climate of

Semarang shows one of the environmental problems. Residential areas on the coast are affected by tidal waves because they are directly adjacent to the sea without or with limited protection, so coastal flooding affects infrastructure such as roads and bridges and brings flooding to coastal settlements.

The tidal flood that occurred was also exacerbated by the habits or behavior of the community in paying attention to environmental cleanliness and health. People's behavior and awareness of environmental hygiene and health are still lacking. The lack of care and understanding of the Semarang Coastal community towards ecological conditions can be seen in how people live, most of which do not reflect a clean living culture. It can be observed that there is still a lot of garbage scattered and piled up in the neighborhood.

According to Suryanti and Marfai (2008), the impact of tidal flooding is disruption of daily activities, including household activities, disruption of road accessibility, and limited use of advice and infrastructure. The effect of tidal flooding has damaged coastal infrastructure due to coastal abrasion. As a result, coastal residents will lose their homes and livelihoods. One of the impacts and effects of tidal flooding is on land use as productive land. The environment is one of the

essential roles and has a positive effect on the realization of public health status. Human life is very dependent and influenced by the conditions and existence of the environment. Tidal flooding impacts the environment, society, and economy (Mussadun et al., 2022). Tidal flood conditions also affect social life. Social life is summarized in the social interactions of community members affected by tidal flooding. Community activities are disrupted by tidal flooding. This has indeed been the case for decades in terms of the physical environment; for example, in building houses, they will adapt to the context of the social environment, apart from disturbances caused by tidal flooding, which can interfere with residents' activities, in other aspects, it can increase a sense of solidarity.

METHODS

This study uses phenomenological qualitative research. Qualitative research is based on specific research methodological traditions by investigating social or human problems (Creswell, 2012). There are several first stages of qualitative phenomenology to find an initial database on the condition of communities affected by tidal flooding on the coast of Semarang, namely in the Kaligawe and Tambak Lorok areas. Several stages were carried out, namely, the collection and analysis of qualitative data. At this stage, observations were carried out with in-depth interviews and documentation about the impact of the tidal flood and the visible solidarity. The results of the initial data from qualitative data are then followed up to analyze the phenomena that occur in the field regarding the condition of the community affected by the tidal flood. Collecting and analyzing qualitative data, this stage is carried out to determine the solidarity of the community affected by the flood. This study's qualitative data analysis technique consisted of three activities that co-occurred: data reduction, data presentation, and conclusion drawing/verification (Miles and Hubberman, 1992). Qualitative data analysis is an ongoing,

iterative, and continuous effort. The problem of data reduction, data presentation, and concluding is a series of analytical activities that follow one another.

RESULTS AND DISCUSSION

The phenomenon of rob flooding in Semarang City

Flood is a natural process and disaster that worries residents living around significant rivers. The types of floods include inundation, local flooding, postal flooding, tidal flooding (Rob), and flash flooding. The factors that cause flooding, in addition to rainfall as the primary source of the flooding, determine the area's biophysical conditions (Setyowati DL, 2019). The phenomenon of tidal flooding in the coastal area of Semarang is the result of the process of changing land use in coastal regions with the Construction of ponds, swamps, and rice fields which used to accommodate tides of sea water naturally and have now turned into residential areas, industrial areas and other uses of the sea. There is only about 790.5 Ha of land in North Semarang, and there is no pond land; from 585 Ha of total land in West Semarang, there are only about 126.5 Ha of land in West Semarang. In addition to land use changes, tidal flooding in Semarang City is influenced by *land subsidence*; this land subsidence is caused by a decrease in the groundwater level, ground cover conditions related to building loads, and consolidation. The decline in groundwater level is getting more significant to the east. Taking groundwater for industrial purposes on a large scale makes the groundwater level in the eastern region increasingly decreased. The decrease in groundwater level in Semarang in the 1970s was only 0.5- 3.5 cm. Year after year, it continued to increase, and in the 2000s, it reached 11.5-24.6 cm. This decrease in groundwater level was influenced by the type of soil layer on the Semarang coast, which experienced natural compaction. (Kahar *et al.*, 2010).



Figure 1. Rob flooding in the Tambak Lorok area

The next factor is the occurrence of natural compaction; according to (Yuwono, 2013), areas with a high level of reduction are in the northern part of Semarang City, with a tendency to increase eastward to Genuk District. Industrial Estates make the soil load bigger and decrease. At

this time, efforts have been made to overcome tidal flooding, especially in the East Semarang and Kaligawe Gayamsari areas, namely by building the normalization of the East Flood Canal.

Table 1. Rob Flood Disaster Management

Program Semarang City Government Program	Efforts made by the Community
1. Construction and Maximization of Drainage System	1. Building Raising
2. Construction of Pump Stations	2. Community Service Work Houses cleaning drains and garbage
3. Normalization of East Flood Canal	3. Construction of Emergency Embankments
4. Road	4. Formation Disaster Awareness Community Group
5. Raising Construction of parapets (water barrier walls)	

Source: Researcher

Physical Environment Conditions

Adaptation and change are two sides of a coin that are inseparable from living things. Adaptation applies to every living thing in living life in an ever-changing environmental condition. Bennet (1976) views adaptation as a human response to environmental changes. This responsive behavior allows them to organize specific systems for their actions or behavior to adapt to existing situations and conditions. The conduct mentioned above is related to life's needs after going through certain circumstances and then building a strategy and certain decisions to deal with the following situations. Thus, adaptation is a strategy used by humans in their lifetime to anticipate environmental changes, both physical and social.

As a change process, adaptation can end with something that is expected or not expected. Therefore, adaptation is a system of continuous interaction between humans and humans and

between humans and their ecosystems. Thus, human behavior can change an environment or vice versa; a changing climate requires an adaptation that can continuously be renewed so that humans can survive and carry on living in their environment. Adaptation is one part of the process of cultural evolution, which includes a series of human efforts to adapt or respond to changes in the physical and social environment that occur temporally. Adaptation in terms of the physical environment can be in building houses.

In Kaligawe Village, the physical environmental conditions are influenced by several things, including the state of the village roads. For several periods the streets in the villages in the Kaligawe area have been elevated because flood conditions have caused for several years tidal floods have flooded the village roads; if the tidal season comes, it can even be worse at the same time. With the rainy season. The effect of the road's elevation is that the house's position

under the village road will be more severe. This also impacts the physical environment used for the general public; for example, it is a place of

worship. Economically capable, they will raise the house but with conditions, for example, filling it.



Figure 2. The house building in Kaligawe Village, which was destroyed because it had been submerged for a long time, was also located under the village road.



Figure 3. The condition of the house that is looking for the roof remaining, but the walls are modified so that it can still be inhabited

Social Environmental Conditions

The concept of the social environment is closely related to social solidarity. Social solidarity is a collective concern for a group that shows a relationship between individuals and groups based on moral equality, the same collaborative and shared beliefs, and strengthened by emotional experience (Nasution, 2009). In Nasution (2009), the principles of community social solidarity include helping each other, caring for each other, being able to work together, sharing crops, and working together. In supporting development both financially and human resources.

In the Kaligawe and Tambak Lorok communities, the tidal flood affected Semarang's social and environmental conditions, but many

people still choose to stay in their community. This is due to several things, including the feeling of sharing the same fate that has existed for a long time, so forming relationships is like family ties. It happened in Kampung Sawah Besar Kaligawe Semarang; instead of moving their house, they preferred to modify their home, which was submerged by the tidal flood; then, in another case, it was also found due to the lack of funds which caused them inevitably have to survive as happened in the village of Tambak Loro but more than that they say that the main reason is that they have lived in the area for a dozen years so that social solidarity is very well formed. The community also routinely carries out cooperation to clean up the environment. Several social activities are also routinely carried out, for

example, monthly social gatherings, as a homestead, recitation of this activity also strengthens social bonds between communities.



Figure 3. Residents of Sawah Besar Kaligawe Gotong Royong Cleaning Ditches and Installing Prohibition Signs for Disposing of Garbage Indiscriminately

People are required to adjust to the Rob phenomenon due to the occurrence of Rob, which results in various repercussions. In the community, adjustments are being made to everything from the social systems to the farming systems, the social systems, livelihoods, and housing. This modification ensures their survival and allows them to remain in their homes. Integration can be seen in the number of persons who have diversified their sources of income to maintain their current standard of living (Setyowati et al., 2017). It is essential to instill Rob's caring habits to preserve the link between the community and the structural behavior that the community has carried out for many years. The communities' ability to learn from their routines and turn them into unwritten norms has allowed them to become more resilient in the face of natural disasters like Rob. Rob's culture of anticipating, also known as Rob's catastrophe education, is the habit that has been formed due to what has been done. However, this activity is not yet productive because there are still challenges to overcome. The lack of operational funds for activities owned by the Disaster Preparedness Group, the absence of facilities and infrastructure to support activities, the condition of some members who do not care, and the condition of the community in the area are all obstacles. Other obstacles include the disease of some members who do not care. The part that the community plays in initiatives of self-help Coastal management and reclamation provides several issues, particularly concerning funding, mentality, infrastructure, and community participation; these problems, which call for

answers, need to be addressed (Setyowati, Hardati, et al., 2021). One factor determining the carrying capacity of the watershed is the degree to which the land has been developed into communities. While considering Semarang City's susceptibility to flooding, spatial design in the upstream and downstream watersheds will be able to lessen the amount of damage caused to watersheds and the number of times that coastal rivers experience flooding. The design of policy is based on the existing land conditions, the cover of vegetation, the management of water, and the sustainable use of space following the carrying capacity of the watershed. To achieve a watershed with a carrying capacity that is both sustainable and manageable, there must be strong cooperation between all parties, institutions, and individuals involved in watershed management. This includes collaboration between government agencies, the private sector, and the community (Setyowati, Wilaksono, et al., 2021).

High population density, condition of the road network that is inundated by tidal flooding, less than an optimal condition of drainage channels, residential areas in lowlands, public facilities that are flooded by tidal flooding, high building density, decreased income of people in vulnerable sectors and decreased water catchment areas are all contributing factors. High population density is also a risk factor. Regions of mangrove forest, residential neighborhoods near rivers, and built-up areas in wetlands In aquaculture, settlement, and warehousing regions, risk reduction strategies are developed based on these vulnerability elements (Putra et al., 2014). Even though the community is in complete lack due to

losses caused by the tidal flood tragedy, it has shown that it is resilient by still preserving unity, integrity, and integrity even at the level of the village. Establishing stability in the community reflects the resilience that is being found in this aspect (Asrofi & Ritohardoyo, 2017).

CONCLUSION

The condition of the physical environment for the community affected by tidal flooding on the coast of Semarang in the Kaligawe and Tambak Lorok areas, the community adapts to the physical building of their houses. This is done so that homes are not submerged by tidal flooding because the position of the house is lower than the village road. The condition of the social environment in the community affected by the tidal flood on the coast of Semarang in the Kaligawe and Tambak Lorok areas formed inner and cultural bonds in the community because they lived in the same conditions for dozens or even decades; these bonds were also included in community social activities..

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